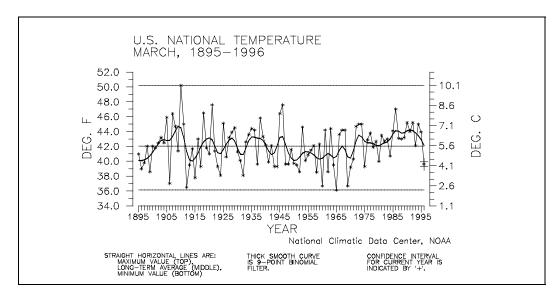
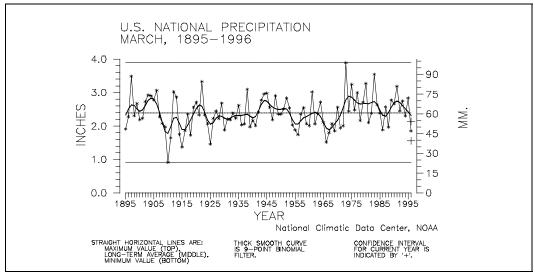
CLIMATE VARIATIONS BULLETIN







This CLIMATE VARIATIONS BULLETIN (CVB) is a preliminary report that puts current monthly climate anomalies into historical perspective using climate databases archived at the National Climatic Data Center (NCDC). It is issued on a monthly basis. Supplemental sections are included which address seasonal and annual perspectives, when appropriate.

Current data are based on preliminary reports from First and Second Order airport stations obtained from the National Weather Service (NWS) Climate Analysis Center, and preliminary tornado statistics obtained from the NWS National Severe Storms Forecast Center. THE CURRENT DATA SHOULD BE USED WITH CAUTION. These preliminary data are useful for estimating how current anomalies compare to the historical record, however the actual values and rankings for the current year will change as the final data arrive at NCDC and are processed.

The following NCDC datasets are used for the historical data: the climate division drought database (TD-9640), the hurricane datasets (TD-9636 and TD-9697), the tornado dataset (STORM DATA), and the monthly station dataset (LCD supplemental files). It should be noted that the climate division drought database consists of monthly data for 344 climate divisions in the contiguous United States. These divisional values are calculated from the 6000+ station Cooperative Observer network.

The narrative, tables, and graphs in the CVB are also available via automated facsimile. The previous month's summary can be obtained after the tenth of the month by dialing 704-271-4570 and selecting the appropriate menu codes. A touch-tone fax machine is required.

If you have access to the Internet, copies of the CVB are available via both the NCDC's World Wide Web (WWW) server and the NCDC's anonymous FTP server.

NCDC's WWW server

URL for the CVB: http://www.ncdc.noaa.gov/publications/cvb/cvb.html

NCDC's anonymous FTP server

Machine: ftp.ncdc.noaa.gov Directory: /pub/data/cvb

If you are a climate researcher and would like to order copies of the historical datasets used to make graphs of the type in this report, call 704-271-4994 or fax a letter to 704-271-4876 or mail a letter to the address given below, ATTN: Research User Services.

All other questions or requests for data should be made by calling 704-271-4800 or sending a fax to 704-271-4876 or by writing to:

National Climatic Data Center, NOAA
Federal Building
151 Patton Avenue, Room 120
Asheville, NC 28801-5001

If you use any of the information from this CVB, please identify "National Climatic Data Center, NOAA" as the source.

UNITED STATES MARCH CLIMATE IN HISTORICAL PERSPECTIVE

William O. Brown
National Climatic Data Center, NOAA
Global Climate Lab, Global Analysis Branch
Federal Building
Asheville, NC 28801 USA

Preliminary data for March 1996 indicate that temperature averaged across the contiguous United States was below the long-term mean (see Figure 1). March 1996, with an averaged temperature of 39.6° (F), ranked as the 23rd coolest March since national records began in 1895. The 1996 value is based on preliminary data, which has been shown to be within 0.32°F (0.18°C) of the final data over a 7-year period. This confidence interval is indicated in the figure by '+'. The darker smooth curve is a nine-point binomial filter that averages out the year-to-year fluctuations and shows the longer-term variations. Roughly thirteen percent of the country averaged much cooler than normal while two percent of the country averaged much warmer than normal for March 1996.

With an areally-averaged national precipitation value of 1.85 inches, March 1996 was the 10th driest March on record. The preliminary value for precipitation is estimated to be accurate to within 0.29 inches (7.36 millimeters) and the confidence interval is plotted in Figure 2 as a '+'. Nearly 25% of the country experienced much drier than normal conditions while less than two percent was wetter than normal.

Historical precipitation is shown in a different way in Figure 3. The March precipitation for each climate division in the contiguous U.S. was first standardized using the gamma distribution over the 1931-90 period. These gamma-standardized values were then weighted by area and averaged to determine a national standardized precipitation value. These national weighted values were then normalized over their period of record. Negative values are drier and positive values are wetter than the mean. This index gives a more accurate indication of how precipitation across the country compares to the local normal (60-year average) climate. The preliminary national standardized precipitation ranked March 1996 as the fifth driest such month on record. This standardized zscore is estimated to be accurate to within 0.222 index units and the confidence interval is plotted in Figure 3 as an 'X'.

National averaged temperature for the threemonth period, January-March 1996, is shown in Figure 4. Temperature for the three-month period was only slightly below the long-term mean ranking as the 43rd coolest such period since 1895.

In order to show more of a historical perspective, the precipitation and temperature rankings for the periods October 1995-March 1996 and April 1995-March 1996, the March 1996 temperature rankings and categorical precipitation standings for the nine climatically homogeneous regions, as well as the national rankings, are listed in Table 1.

The regional rankings for temperature for the month of March indicate that temperatures were much cooler than normal from the northern plains to the Southeast and warmer than normal for the Southwest, West, and Northwest regions. March 1996 was the ninth coolest such month since 1895 for the Southeast region (Figure 5) and the 15th coolest March for the East-North Central, Central, and South regions. At the other extreme, it was the 25th warmest March for the West region (Figure 6). The warmth noted during March for the western third of the country is also noted in the six-month and twelve-month periods. The sixmonth period, October through March was the second warmest on record for the West region and the fourth warmest for the Southwest region. These regions rank 16th warmest and 14th warmest, respectively, for the twelve-month period. The Northwest region had corresponding ranks slightly cooler than these.

Seven of the nine climatically homogeneous regions were ranked within the dry-third of the historical distribution for March 1996. The Central region ranked within the middle-third while the Southeast region ranked within the wet-third of the distribution.

Figure 7A shows, in illustrative map form, the March 1996 temperature rankings for the 48 contiguous states. Six states were within the top-ten cool (DE, FL, GA, IN, NC, & SC) while an additional 28 states ranked within the cool third of the distribution.

No states ranked within the top-ten warm portion of the distribution and only five (AZ, CA, NV, OR, & UT) states were within the warm third of the distribution.

March 1996 state categorical ranks for precipitation are shown in Figure 7B. Twenty-seven states ranked within the dry-third of the historical distribution while only three states ranked within the wet third. (It should also be noted that these March state categorical precipitation ranks are preliminary and should be used with considerable caution due to the high variability of precipitation on a small space and time scale.)

Long-term drought coverage in the United States during March increased while the area of the country experiencing severe to extreme wetness decreased slightly. Nationally, long-term drought conditions (as defined by the Palmer Drought Index) for March 1996 increased to 12.7% of the country while the percent coverage of severe to extreme wet area fell to about an eighth of the country (Figure 8). Table 2 lists statistics for selected river basins for the 1995-1996 Hydrologic Year. The core wet areas included the northern Great Plains, portions of the northern Rockies and northern High Plains, and portions of the interior The Palmer dry areas included the Southwest, southern California, southern Nevada, southern Rockies, and portions of the lower Mississippi valley.

Table 3 shows extremes, 1961-90 normals, and the March 1996 values for both precipitation and temperature for the nine regions and the contiguous U.S.

Precipitation averaged below normal across the Primary Corn and Soybean Belt for the initial month of the growing season (Figure 9). This is the driest start for the growing since the near-record dryness of March 1981.

According to preliminary data from the National Weather Service's National Severe Storms Forecast Center, there were 82 tornadoes across the contiguous United States in March 1996. The 1953-1995 average tornado count for March is 53. Extremes for March include a minimum of eight tornadoes in 1969 and a maximum of 180 in 1976. For the year-to-date, 119 tornadoes have been documented. The 1953-1995 average tornado count for the three-month period is 88. Extremes for the year-to-date are a maximum of 229 in 1976 and a minimum of 16 in 1969. It should be noted that the preliminary tornado count is generally higher

than the final count and that observations have generally improved with time.

TABLE 1. PRECIPITATION AND TEMPERATURE RANKS, BASED
ON THE PERIOD 1895-1996. 1 = DRIEST/COLDEST,
102 = WARMEST FOR MARCH 1996 TEMPERATURES,
101 = WETTEST/WARMEST FOR OCT 1995-MAR 1996,
101 = WETTEST/WARMEST FOR APR 1995-MAR 1996.
PRESENT MONTH PRECIPITATION EXPRESSED CATEGORICALLY:
WET = WET 1/3 OF THE HISTORICAL DISTRIBUTION,
MID = WITHIN THE MIDDLE 1/3 OF THE DISTRIBUTION,
DRY = DRY 1/3 OF THE HISTORICAL DISTRIBUTION.

REGION		OCT 1995- MAR 1996				
PRECIPIT	PRECIPITATION:					
NORTHEAST	DRY	82	24			
EAST NORTH CENTRAL	DRY	69	68			
CENTRAL	MID	21	49			
SOUTHEAST	WET	73	75			
WEST NORTH CENTRAL	DRY	51	90			
SOUTH	DRY	4	22			
SOUTHWEST	DRY	1	13			
NORTHWEST	DRY	82	91			
WEST	DRY	25	42			
NATIONAL	DRY	17	45			
TEMPERA	TEMPERATURE:					
NORTHEAST	26	30	32			
EAST NORTH CENTRAL	15	12	13			
CENTRAL	15	20	22			
SOUTHEAST	9	15	18			
WEST NORTH CENTRAL	16	25	21			
SOUTH	15	44	32			
SOUTHWEST	67	98	86			
NORTHWEST	69	74	74			
WEST	78	100	88			
NATIONAL	23	42	39			

TABLE 2.

STATISTICS FOR SELECTED RIVER BASINS:

AREAL PERCENT OF THE BASIN EXPERIENCING SEVERE OR

EXTREME LONG-TERM (PALMER) DROUGHT, AND AREAL PERCENT

OF THE BASIN EXPERIENCING SEVERE OR EXTREME LONG-TERM

(PALMER) WET CONDITIONS, AS OF MARCH 1996.

RIVER BASIN REGIONS AS DEFINED BY THE U.S. WATER

RESOURCES COUNCIL.

RIVER BASIN	% AREA DRY	% AREA WET
	.0% .0% 28.8%	
GREAT BASIN UPPER COLORADO BASIN LOWER COLORADO BASIN RIO GRANDE BASIN		
ARKANSAS-WHITE-RED BASIN TEXAS GULF COAST BASIN SOURIS-RED-RAINY BASIN UPPER MISSISSIPPI BASIN		.0% .0% 78.2% 7.2%
LOWER MISSISSIPPI BASIN GREAT LAKES BASIN OHIO RIVER BASIN TENNESSEE RIVER BASIN	32.2% .0% 4.8% .0%	.0%
NEW ENGLAND BASIN MID-ATLANTIC BASIN SOUTH ATLANTIC-GULF BASIN	.0% 2.3% .0%	

TABLE 3. EXTREMES, 1961-90 NORMALS, AND 1996 VALUES FOR MARCH. IT SHOULD BE NOTED THAT THE 1996 VALUES WILL CHANGE DUE TO THE USE OF A DENSER STATION NETWORK.

	PRECIP	PRECIPITATION (INCHES)				
	DRIEST	WETTEST	NORMAL	1996		
REGION	VALUE YEAR	VALUE YEAR	PCPN	PCPN		
NORTHEAST	.71 1915	6.56 1936	3.14	2.21		
EAST NORTH CENTRA	L .21 1910	3.50 1977	1.89	1.07		
CENTRAL	.55 1910	6.91 1897	3.92	3.38		
SOUTHEAST	1.54 1910	8.89 1980	4.75	5.61		
WEST NORTH CENTRA	L .39 1994	2.10 1987	1.02	.70		
SOUTH	.89 1966	6.28 1973	2.83	1.65		
SOUTHWEST	.20 1956	2.90 1905	1.02	.37		
NORTHWEST	.58 1965	5.46 1904	2.72	1.86		
WEST	.09 1914	6.28 1907	2.23	1.22		
NATIONAL	.91 1910	3.89 1973	2.47	1.85*		

^{*} PRELIMINARY VALUE, CONFIDENCE INTERVAL + OR - .29 INCHES

	TEMPERATURE (DEGREES F)					
	COLDE	EST	WARN	/IEST	NORMAL	1996
REGION	VALUE Y	/EAR	VALUE	YEAR	TEMP	TEMP
NORTHEAST	25.1 1	L916	42.5	1946	33.4	30.3
EAST NORTH CENTRAL	18.8 1	L960	42.2	1910	29.9	24.2
CENTRAL	29.0 1	L960	53.0	1946	43.0	37.9
SOUTHEAST	44.9 1	L960	63.2	1945	54.7	50.5
WEST NORTH CENTRAL	19.1 1	L965	43.4	1910	31.2	25.1
SOUTH	43.7 1	L915	62.6	1907	53.6	49.8
SOUTHWEST	35.6 1	L917	49.0	1910	41.9	42.9
NORTHWEST	31.0 1	L917	46.0	1934	38.6	39.4
WEST	39.5 1	L897	55.0	1934	46.3	48.7
NATIONAL	36.1 1	L965	50.2	1910	42.4	39.6*

^{*} PRELIMINARY VALUE, CONFIDENCE INTERVAL + OR - .3 DEG. F.

U.S. NATIONAL TEMPERATURE MARCH, 1895-1996

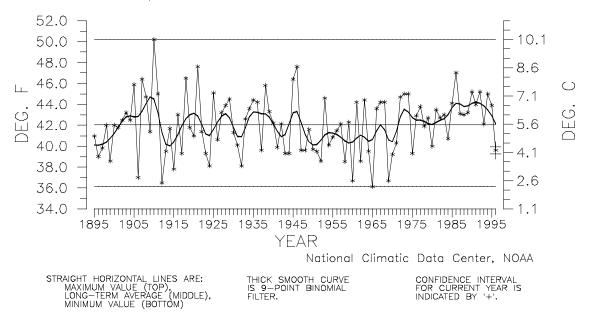
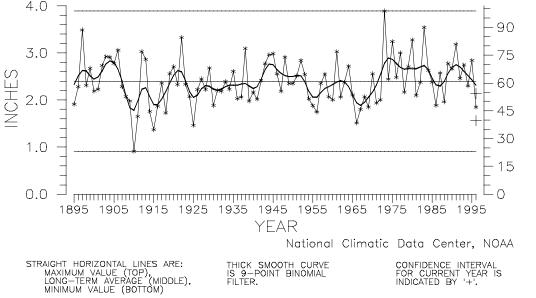


Figure 1

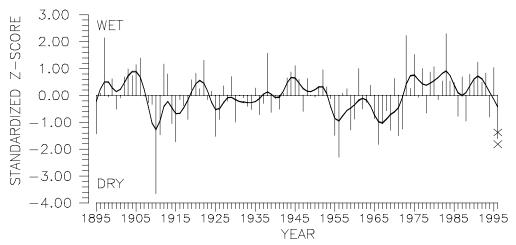
U.S. NATIONAL PRECIPITATION MARCH, 1895—1996



 $\stackrel{\cdot}{\geq}$

Figure 2

U.S. NATIONAL NORMALIZED PRECIPITATION INDEX MARCH, 1895-1996



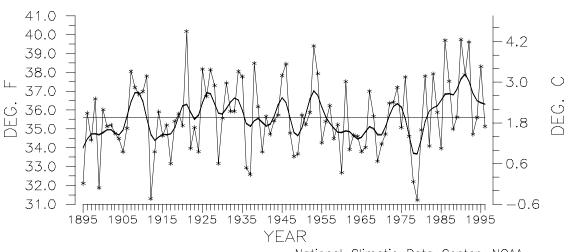
National Climatic Data Center, NOAA

THICK SMOOTH CURVE IS 9-POINT BINOMIAL FILTER.

CONFIDENCE INTERVAL FOR CURRENT YEAR IS INDICATED BY 'X'.

Figure 3

U.S. NATIONAL TEMPERATURE JANUARY-MARCH, 1895-1996

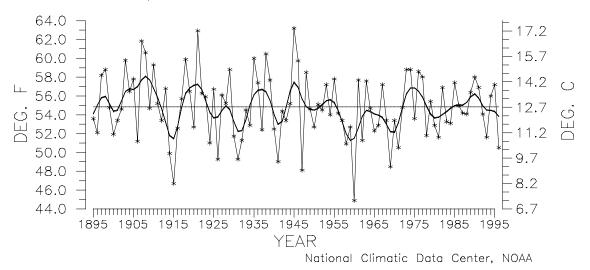


National Climatic Data Center, NOAA

THICK SMOOTH CURVE IS 9-POINT BINOMIAL FILTER.

Figure 4

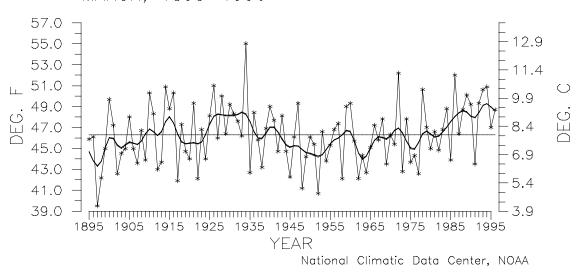
SOUTHEAST REGION TEMPERATURE MARCH, 1895-1996



THICK SMOOTH CURVE IS 9-POINT BINOMIAL FILTER.

Figure 5

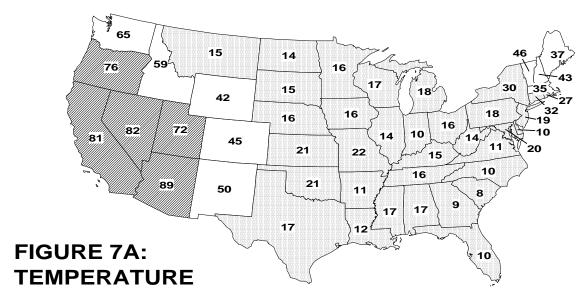
WEST REGION TEMPERATURE MARCH, 1895-1996



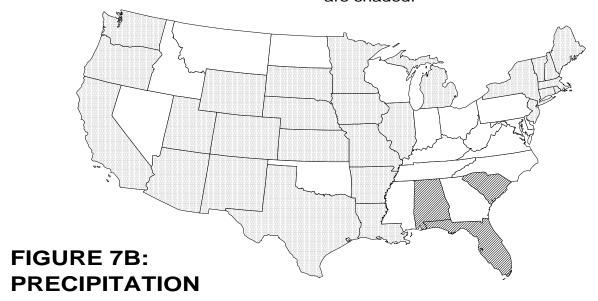
THICK SMOOTH CURVE IS 9-POINT BINOMIAL FILTER.

Figure 6

MARCH 1996 STATEWIDE RANKS



1 = Coldest 102 = Warmest Temperature Ranks for the contiguous United States. Each state is ranked based on its data from 1895-1996. States having a rank in the warm third or cool third of their historical distribution are shaded.



National Climatic Data Center, NOAA

Wet Third Precipitation Rank Categories for the contiguous United States. Each state is ranked based on its data from 1895-1996. States having a rank in the wet third or dry third of their historical distribution are shaded.

U.S. PERCENT AREA DRY AND WET

JANUARY 1991 THROUGH MARCH 1996

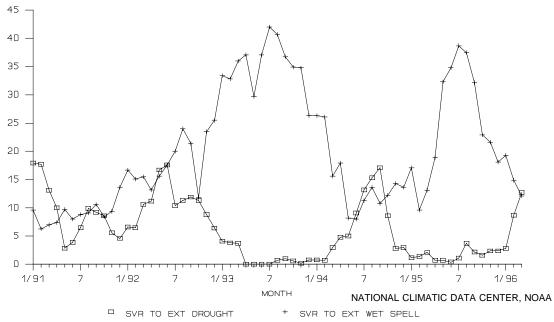


Figure 8

PRIMARY CORN AND SOYBEAN BELT PRECIPITATION MARCH, 1895-1996

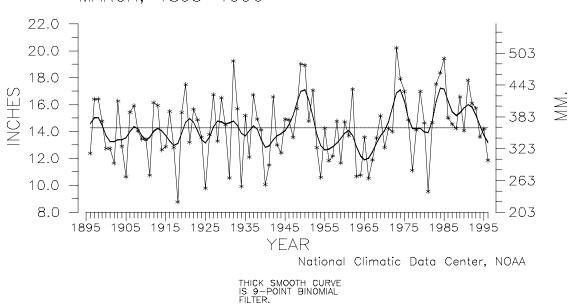


Figure 9